

CLAIMS

1. A casting process comprising the steps of:
mixing one or more kind of an aggregate granular material, one or more kind of a water-soluble binder, and water, to form a mixture of said aggregate granular material, and stirring said mixture to cause it to foam;
charging said foamed mixture into a molding space, and evaporating the moisture within said charged mixture to harden said charged mixture to mold a mold with said hardened mixture;
assembling at least one mold that is cast in said hardened mixture and the mating mold to form a completed mold;
pouring molten metal into said completed mold;
removing said completed mold from a cast article that is composed of the solidified molten metal during a process of cooling said cast article after said molten metal solidifies; and
applying a heat treatment to said cast article.
2. A casting processes as recited in claim 1, wherein said at least one mold that is cast in said hardened mixture is a core, and said mating mold is a master mold.
3. A casting processes as recited in claim 2, wherein said master mold is a metal mold.
4. A casting processes as recited in claim 2, wherein said master mold is a sand mold.
5. A casting process as recited in any one of the preceding claims, further comprising steps of returning said aggregate granular material, and recovering said returned aggregate granular material.

6. A casting process as recited in claim 5, further comprising steps of recycling and using said returned and recovered aggregate granular material for molding a mold.
7. A casting process as recited in claim 5 or 6, wherein said steps of returning and recovering said aggregate granular material are mechanical recovering processes.
8. A casting process as recited in any of the preceding claims, wherein said cast article is cast in an aluminum alloy or a magnesium alloy.
9. A casting process as recited in claim 8, wherein said heat treatment is a T6 treatment or a T7 treatment.
10. A casting process as recited in any one of claims 1-7, wherein said cast article is cast in a casting iron, a casting steel, or a ferrous alloy.
11. A casting process as recited in any one of claims 1-7, wherein said cast article is cast in a copper alloy.
12. A casting process as recited in any one of claims 1-7, wherein said step of removing said completed mold from said cast article is to apply shakes in said mold.
13. A casting process as recited in any one of claims 1-7, wherein said step of applying said shakes in said mold includes impact forces of less than 1MPa at an operating frequency at less than 30Hz being applied in said mold for less than 30 seconds, within from 5 to 20 minutes after said molten metal is poured.
14. A casting process comprising the steps of:
mixing one or more kind of aggregate granular material, one or more kind of a water-soluble binder, and water, to form a mixture of said aggregate granular material, and stirring said mixture to cause it to foam;

charging said foamed mixture into a molding space, and evaporating the moisture within said charged mixture to harden said charged mixture to mold a core with said hardened mixture;

assembling at least one core that is cast in said hardened mixture and a metal mold to form a completed mold;

pouring a molten aluminum alloy into said completed mold;

removing said core from a cast article that is composed of the solidified molten aluminum alloy during a cooling process of said cast article after said molten metal is solidified; and

applying the T6 or T7 heat treatment to said cast article that is cast in said aluminum alloy.

15. A casting process as recited in any of claims 1-14, wherein said one or more kind of said water-soluble binder is at least either a polyvinyl alcohol or its derivative, or at least either a starch or its derivative.